

Epidemiological Study about Children Burns Injury in the North of Morocco

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Abstract

Original Research Article

Children are a population particularly at risk of burns, associated with high mortality in developing countries, associated with poverty, and poor infrastructure. The study of the epidemiology of burns in these countries aims to target prevention campaigns. The objective of our study is to study the epidemiological aspects of burns in the infant population in the region of Tangier-Tetouan-Al Hoceima, to determine the etiopathogenic aspects, and to describe the methods of prevention. This study was carried out retrospectively, by collecting the most frequent etiologies, the sex, and the site of the accident in 76 children admitted for burns to the emergency rooms of the regional hospital of Tangier, over 6 months from April 2021 to September 2021. The ages of our children ranged from 1 to 12 years old. The average age was 4 years and 2 months. A male predominance was found with 56 boys (73.68%) and 20 girls (26.32%). The scalding burn was observed 65 times (85.53%), by flame 8 times (10.53%), and another mechanism 3 times (3.95%). All of the burns occurred at home (100%). The causative agent was hot water in 48 cases (63.16%), other liquids in 17 cases (22.36%). Explosions of a small gas cylinder were also observed in 4 cases (5.26%) or a gas oven in 4 cases (5.26%), And another cause was observed in 3 cases (3.95%). It is necessary to know that the burn is a frequent trauma, making it a real public health problem, Hot liquids are the most implicated causative agent in the pediatric population. The flame is also frequently responsible for burns. The management must be intense; early and multidisciplinary to improve the vital and functional prognosis of these patients. Prevention remains the way to avoid serious burns, especially the education of mothers.

Keywords: Burn, child, scald, epidemiology, prevention.

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INTRODUCTION

Child burn is an important cause of accidental morbidity and mortality. It remains a frequent emergency in our daily practice. As the etiology of burns may vary from one region to another, worldwide local studies are necessary to update preventive measures (Boukind et al., 1995)[1]. These burn injuries constitute a major cause of morbidity and mortality worldwide. Children are at risk for burn injuries because of their curiosity, their mode of reaction, their compulsiveness, and their lack of experience in the calculation of risk. A prevention program is, therefore, necessary to reduce the current spate of morbidity and mortality.

Many burns that occur in the first two decades of life are accidental and preventable. This study aimed to determine the demographic features, mortality, and other factors associated with pediatric burns admitted to the emergency of the regional hospital of Tangier and to have a global idea about the child burn injury in the region of Tangier-Tetouan-Al Hoceima (north of Morocco).

MATERIALS AND METHODS

A retrospective review of all burn injuries observed in children under the age of 16 years at the emergency of the regional hospital of Tangier from 01/04/2021 to 30/09/2021. The children's case notes were reviewed. Information obtained included age, sex, site, and type of burn, source, and method of sustaining burn injury, associated morbidity, etc.

The results were collated and analyzed using the EXCEL program with tables, frequencies, and percentages. These were used as guidelines for the prevention of children's burn injuries in the north of Morocco.

RESULTS

A total of 76 children presented to the emergency the regional hospital of Tangier during the period under study.

The mean age was 4 years and 2 months, 60.53% of the patients were aged less than 5 years old (Table 1).

Table 1: Distribution of patients according to the age

	Number	Percentage
0--4 Ans	50	65.79%
5--8 Ans	16	21.05%
9--12 Ans	10	13.16%
13-16 Ans	0	0.00%

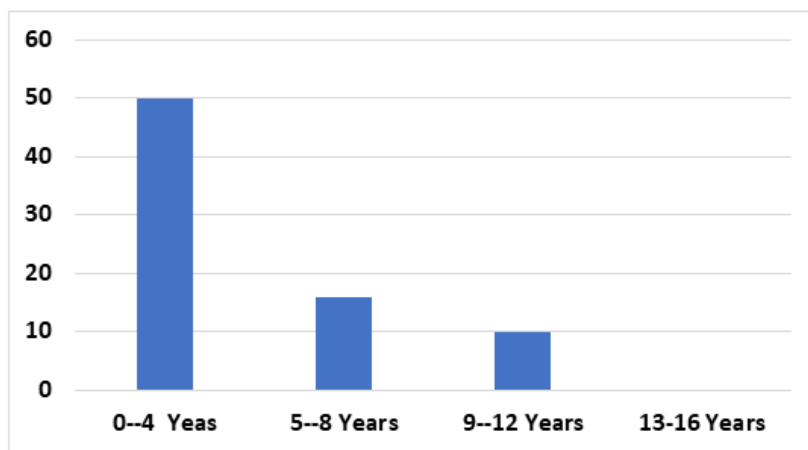


Figure 1: Distribution of patients according to the age

There were 56 (73.68%) boys and 20 (26.32%) girls. The male to female ratio was 2.8 to 1.

Of all burns, 74 (97.37%) are thermal origin; scalding burn is the leader in 65 cases (85.53%), hot water was the cause in 48 cases (63.16%), other liquid in 17 cases (Soup 9/11.84%, Coffee 4/ 5.26%, Tea 4/

5.26%) a flame in 8 cases (10.53%), either by the explosions of a small gas cylinder in 4 cases (5.26%) or by a gas oven in 4 cases (5.26%). Contact with iron was observed in 1 case (1.32%) electric current in 1 case (1.32%) and exploding of a firecracker in 1 case (1.32%) (Table 2 and Table 3).



Figure 2: 2 years old infant with superficial second-degree burn

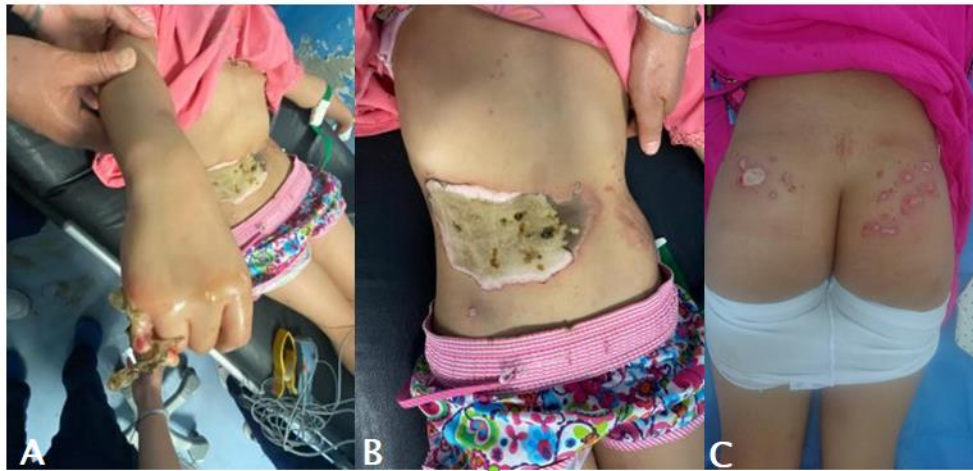


Figure 3: Appearance of lesion of the electrical burn on admission A: entry point (pinky finger of theright hand) B: exit point (abdomen) C another lesion in the gluteal region

Table 2 : Distribution of patients according to burn agent

	Number	Percentage
Flame	8	10.53%
Scalding	65	85.53%
Electric	1	1.32%
Explosion	1	1.32%
Contact	1	1.32%

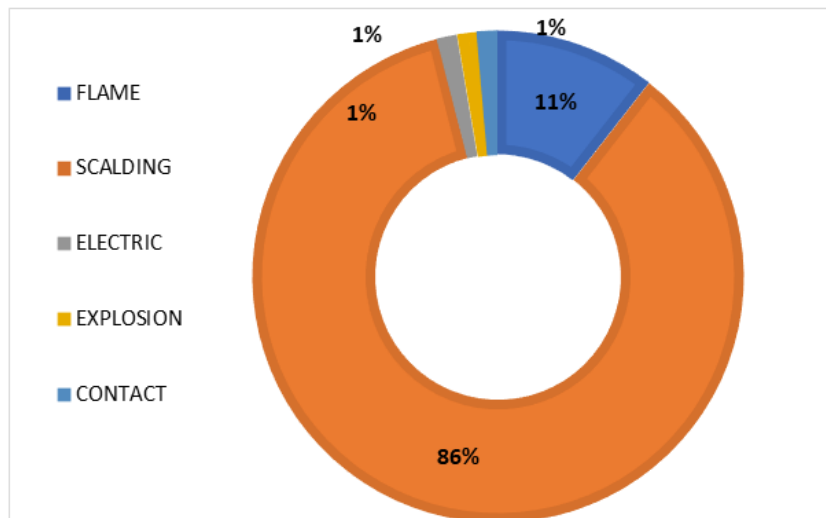


Figure 4: Distribution of patients according to burn agent

Table 3: Distribution according to the causative agent

		Number	Percentage
Thermal	Water	48	63.16%
	Gaz cylinder	4	5.26%
	Tea	4	5.26%
	Soup	9	11.84%
	Gaz oven	4	5.26%
	Coffee	4	5.26%
	Iron	1	1.32%
Cracker firecracker		1	1.32%
Electric		1	1.32%



Figure 5: Burn of the hand by firecracker A: (day 1) appearance of lesion: 24 hours after the accident B: (day 7): devitalized tissue debris C: (day 14) healing of the lesion D: complete healing of lesion after 1 month

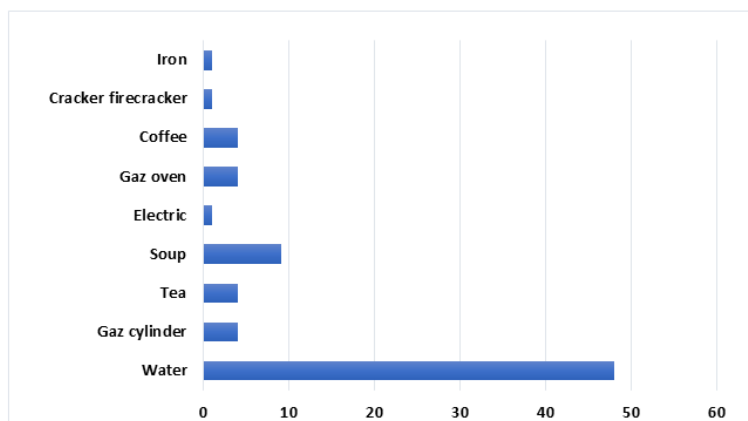


Figure 6: Distribution according to the causative agent

As noted, 63 (82.89%) of the 76 patient subjects were from urban environments while 13 (17.11%) lived in rural areas.

Also, we noted that 42 (55 %) of the patient have belonged to a low socioeconomic level group.

The burn occurs accidentally in 100 % of cases in our study it is due to the recklessness of the children and or the carelessness of the parents.

The house remains the place where the burn occurs the most regardless of its cause especially in the kitchen and the bathroom.

The seasonal distribution of bum injuries showed a significant increase in the summer and during the sacred month of Ramadan (=April 2021) (Figure 8).

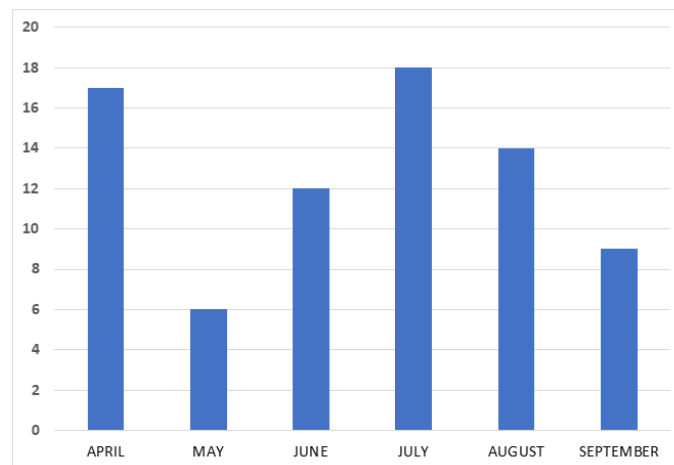


Figure 7: Distribution of admission monthly

The mean TBSA burned was 16.30% (range 1% -60%). The TBSA ranged from 1 to 30 percent in 94.74 percent of the patients (Table 4).

Regardless of age and sex, no area of the body is spared from burning with involvement, with predilection of the upper limbs (63.16%) followed by that of the trunk (43.42%)

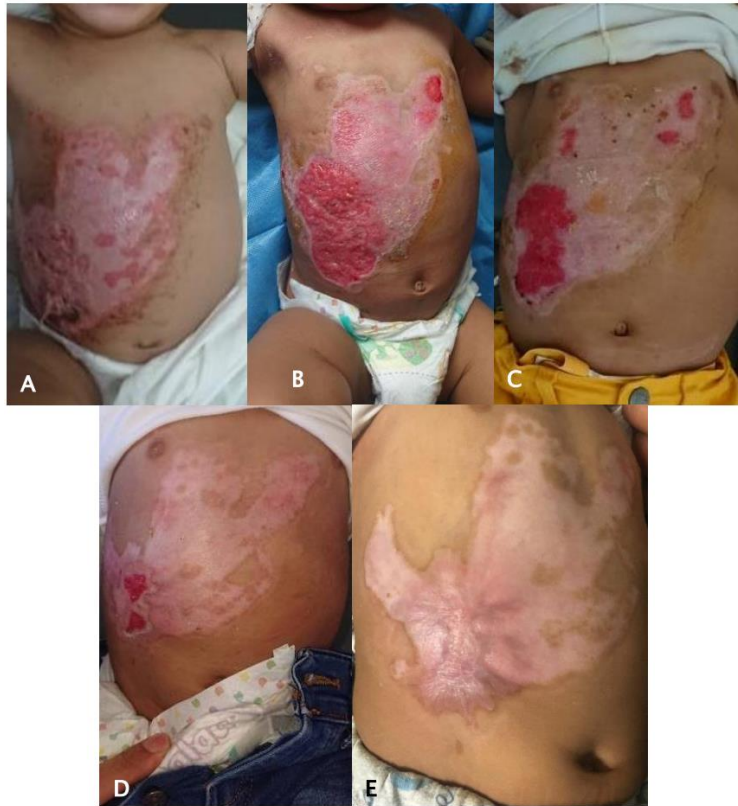


Figure 8: Neglected burn of the abdomen in a 6 years infant A: aspect of lesion in admission 10 days after burn B: devitalized tissue debris with flammazine dressing C and D: marginal epithelialization E: complete healing

Table 4: Distribution according to the TBSA

	Number	Percentage
<10%	18	47.37%
10%--19%	31	81.58%
20%--29%	23	60.53%
30%--39%	0	0.00%
40%--49%	0	0.00%
>50%	4	10.53%

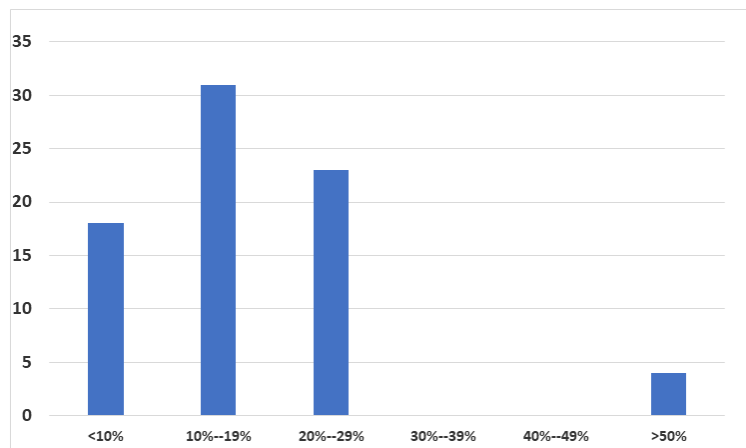


Figure 9: Distribution according to the TBSA

The evaluation of the depth of the lesions makes it possible to note that in 66 cases (86.84 %) the burns are rather superficial.

Only 30 children (39.47%) are benefited, at the scene of the accident, from cooling by tap water or using on their initiative or with the recommendation of

a third person other products (IOSINE, biafine creme, honey, toothpaste, liquid soap...).

Conservative treatment was successful in 73 (96.05%) of the cases. 2 Surgical interventions were carried out for 1 child (electric burn), the first one was an amputation of a finger (Figure 11). And the second one was a skin graft of the abdominal loss of substance (Figure 12).



Figure 10: Necrosectomy of the necrotic pinky finger

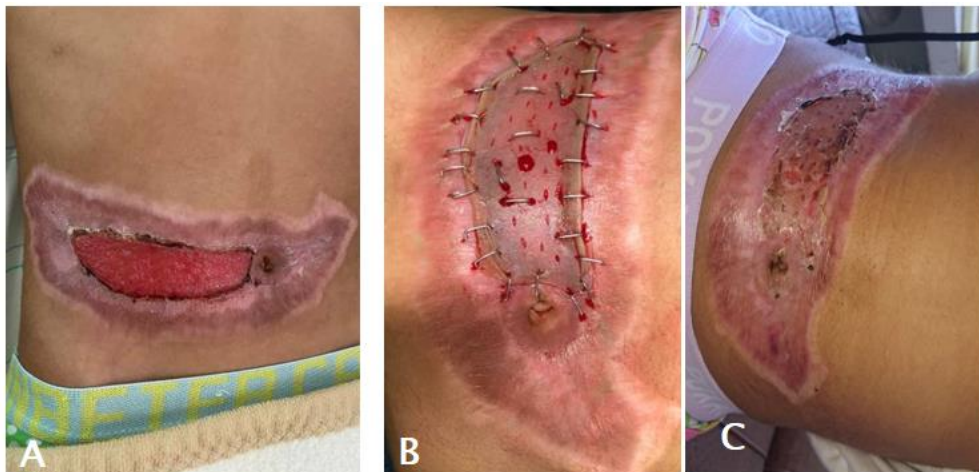


Figure 11: A: loss of substance in the exit point of the electrical burn injury B: the skin graft immediately after the surgery C: Appearance of the skin graft after 1 week

In this work, we deplored 2 deaths among our admitted, which makes a mortality rate of 5.26%, one of them was caused by a cardiovascular collapse and the other by septicemia.

DISCUSSION

Burn injuries constitute a major cause of morbidity and mortality worldwide. Children are at risk for burn injuries because of their curiosity, their compulsiveness, mode of reaction, and their lack of experience in the calculation of risk. Pediatric burn

injuries are second only to motor vehicle accidents as the leading cause of death in children aged 1 to 4 years, and the most frequent cause of injury and death among all children from birth up to the age of 19 (Oseni O.G *et al.*, 2017)[2].

Children with 1-year-old sustain 10 times more burns or scalds than any year of school-age children (Kemp *et al.*, 2014)[3], in our study 36 children (47.37%) are between 1 and 2 years old. The prevailing mechanism involved the toddler reaching for a mug or

cup of tea and pulling it down over themselves or touching household objects including irons, oven hobs, or oven door. This is a clear priority for targeted prevention (Kemp *et al.*, 2014) [3].

In this study, scalds were the predominant cause of burn injury among all pediatric age groups in 65 children (85.53 %), This proportion is similar to the data reported by a study from our country and elsewhere. (Zahid A *et al.*, 2011; Oseni O.G *et al.*, 2017; Arslan *et al.*, 2013)[4], [2], [5].

Among these scalded children, 50 (65.79%) were under the age of 5 years old. This group seems to be characteristically at risk of suffering scald burns which are confirmed by the study of A M Kemp & all (Kemp *et al.*, 2014)[3].

The most common cause of pediatric burns, independent of country and socioeconomic status, was contact with hot liquids, resulting in scalds. Flames were the second most common cause of burns this was also the case in our study. However, the environmental circumstances of scalding differed between developed and developing countries. In developed countries, with formal housing and electricity supplies, scalds were mostly caused by the child pulling at kettle cords. In developing countries, where overcrowded informal housing settlements and lack of access to utilities predominates, scalding occurred when a pot or vessel of boiling liquid on a fire, or gas stove at ground level, was knocked over (Parbhoo *et al.*, 2010)[6].

The majority of pediatric burns occurred in, or near, the home, in both developed and developing countries. Burns occurring in the kitchen, living room, and bathroom were commonly reported (Parbhoo *et al.*, 2010)[6]. We underline the fact that in our study all of these accidents occurred in the home especially in the kitchen and the bathroom and were fundamentally due to the negligence of the adults who were often present at the time of the accident.

The circumstances of injury by scalding liquids are intimately related to the method of cooking and feeding particularly in low-income families. They, serving tea coffee, and soup on the floor or a low table near playing children is a common habit in our country as well as in other regions of the world (Danaf *et al.*, 1991.) [7].

In our study burns by flame were found in 8 children (10.53%) and it was due to the explosion of little gas containers (butane, 3 kg) or a stove (gas oven). The gas containers are really like bombs because of the lack of any adequate safety standards in their manufacture and use. In this dramatic situation, (Boukind *et al.*, 1995)[1]

According to the literature series (Boukind *et al.*, 1995; Kemp *et al.*, 2014; Zahid A *et al.*, 2011)[1], [3], [4] the trunk and the upper limbs are most often injured; this was also true in our series.

Morbidity and mortality from pediatric burn injuries are high in developing countries, partly because of ignorance, poverty, and the non-availability of appropriate burn facilities to take care of these children. (Oseni O. G *et al.*, 2017)[2] in our study, we notify the death of 2 (2.63%) children.

The epidemiology and prevention of burns cannot be conceived without each other. it therefore only makes sense if it is at the origin of preventive actions: intended to reduce the incidence and severity of burns (primary and secondary prevention) or intended to improve the care structures necessary for treatment (tertiary prevention) (Latarjet, 1999)[8].

It has long been recognized in the public health literature that pediatric burns are preventable (Onuba & Udoidiok, 1987)[9]. There is therefore little debate that the best approach for reducing pediatric burns is prevention (Tse *et al.*, 2006)[10]. There is also overwhelming evidence that childhood burns are largely related to the physical environment in which they occur (Tse *et al.*, 2006)[10].

A prevention program is therefore necessary in the developing world to reduce the current spate of morbidity and mortality (Tse *et al.*, 2006)[2].

Preventive measures are the best cure for burns as elsewhere but a change in traditions requires many years of intensive impact from the media Meanwhile recommending wide-based tea-pots redesigning gas containers could reduce scalds in particular and other burn etiologies in general in childhood(Boukind *et al.*, 1995)[1].

Preventing hot beverage scalds is one part of the equation, with secondary prevention through correct burn first aid the other. There is strong evidence to show that adequate burn first aid treatment (cool running water for 20min) applied within 3 hours of the burn occurring has a significant impact on wound healing by reducing burn depth, providing pain relief, improved scar management, shorter hospital stays and fewer surgical interventions (Wood *et al.*, 2016).[11].

The study of Jacqueline D Burgess (Burgess *et al.*, 2019)[12] demonstrates that mothers of young children are largely unaware of how frequently hot beverage scalds occur and the age group most susceptible to them. It also demonstrates an overall gap in knowledge about correct burn first aid treatment, this low knowledge is consistent with many other studies that show the general public is largely unaware of how

to treat a burn.(Davies et al., 2013; Harvey et al., 2011)[13], [14].

All these considerations must lead us to establish a large preventive campaign updated to our local cultural and socio-economical environment, starting with programs to educate mothers. These campaigns must be intensified during the high-risk periods (summer, Ramadan). House management recommendations can help to decrease domestic accidents. (Boukind et al., 1995)[1].

The child during his/her schooling must also be repeatedly warned against the dangers of fires and other risk situations.

CONCLUSION

Many burns that occur in the first two decades of life are accidental and preventable. However, severe burn is a leading cause of morbidity and mortality in children, and burns are the major cause of injury-related death in the pediatric group. Epidemiological data on burns provides information useful in designing strategies to reduce the frequency of injuries and establishing effective methods for burn management. Programs aimed at reducing domestic accidents could prevent many of the deaths caused by burns among children (Kao et al., 2000)[15]

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